

Claims

1. A method of applying a coating to a surface of a substrate, said method the steps of applying a polymer material to the said substrate surface to form at least part of the coating fluorinating the surface of said coating on the substrate and/or curing at least part of the said coating.
2. A method according to claim 1 wherein the polymer material is applied by any or any combination of spin coating, solvent casting, dipping, spraying, plasma deposition, atomisation or chemical vapour deposition.
3. A method according to claim 1 wherein the polymer material includes homopolymers and copolymers.
4. A method according to claim 3 wherein the polymeric components occur singly, in combination with one another or in the presence of non-polymeric additives.
5. A method according to claim 4 wherein the components of polymer blends are miscible or immiscible.
6. A method according to claim 1 wherein the polymer material includes unsaturated bonds.
7. A method according to claim 1 wherein the polymer material is a blend with one component of the blend crosslinkable.
8. A method according to any of the preceding claims wherein a polymer coating forms at least the outer surface of the coating applied to the substrate.
9. A method according to claim 8 wherein the polymer coating forms part of the coating applied to the substrate surface.
10. A method according to any of the preceding claims wherein the polymer material foams only part of the outer surface of the coating.

11. A method according to claim 10 wherein the outermost surface of the coating comprises domains or patterns of polymer material containing unsaturated bonds surrounded by areas consisting of a non-polymeric material or a different polymer material.
12. A method according to any preceding claim wherein the coating comprises additional layers supplementary to the outermost surface layer which consists of combinations of materials.
13. A method according to claim 1 wherein the fluorination of the coating is achieved by selective exposure of the same to atomic, molecular or ionic fluorine containing species.
14. A method according to claim 13 wherein a plasma is used to generate fluorinating species and the coated substrate is disposed within the plasma or exposed to fluorinating species created by a remotely located plasma.
15. A method according to claim 1 wherein the curing of the fluorinated surface affects the cross-linking of the unmodified, unsaturated polymer below the fluorinated surface and the degree of fluorination and roughened surface morphology imparted by the fluorination are substantially unaffected by the curing process.
16. A method according to the claim 15 wherein the method of curing used is any or any combination of heating, VUV radiation, UV radiation, electron beam irradiation or exposure to ionising radiations.
17. A method according to claim 1 wherein the fluorination and curing step include the control of the temperature of the polymer film during the fluorination procedure.
18. A method for applying a coating having liquid repellent characteristics to a substrate, said method comprising the steps of applying a coating to the substrate surface, said coating have at least an outer layer of a polymer including unsaturated bonds, said polymer being fluorinated and cured and wherein the fluorination and/or curing is performed on the polymer material in a selected pattern so as to provide selectively fluorinated and/or cured portions and selectively unfluorinated and/or uncured portions of said coating.

19. A method according to claim 18 wherein the selection made is to completely fluorinate and cure the polymer material of the coating.
20. A method according to the preceding claim wherein the selective pattern of fluorination and/or curing on the substrate surface coating is achieved with the use of a spatially resolved means of curing and/or fluorination such as an ion beam, electron or laser or via masking which matches the selective pattern of fluorination and/or curing required.
21. A method according to claim 20 wherein the mask includes a series of apertures, said apertures, when said mask is placed over the said coating, defining the areas of said coating which are to be fluorinated and/or cured.
22. Apparatus for the generation of the coating for a substrate surface, said apparatus comprising the means for application of a coating to a surface of a substrate, said means for applying a polymer containing unsaturated bonds to form at least the outer surface of the coating, fluorination means for fluorinating the said outer surface of said coating and curing means for curing said outer surface of the coating.
23. Apparatus according to claim 22 wherein the said apparatus includes at least one masking means placed with respect to the coating prior to fluorination and, during the fluorination, said mask allowing the selective fluorination of exposed portions of said coating.
24. Apparatus according to claim 23 wherein a masking means is provided for placement with respect to the coating during curing to allow selected curing of portions of said coating.
25. Apparatus according to any of the preceding claims wherein the pattern of fluorination and curing match.
26. A substrate having at least one surface to which a coating is applied, said coating having at least an outer layer of polymer material and at least a portion of said polymer material is fluorinated and cured to provide the same with improved liquid repellent and durability characteristics.

27. A substrate according to claim 26 wherein the selective portions of the polymer material which are not fluorinated and/or cured can act as collecting areas for liquid.
28. A substrate according to claim 27 wherein the substrate has defined therein a number of spaced liquid collection areas, each separated by areas of increased liquid repellence.